FOREST PEST CONDITIONS

IN THE

ROCKY MOUNTAIN REGION

1989

By

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and

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Timber, Forest Pest, and
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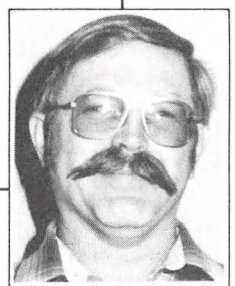

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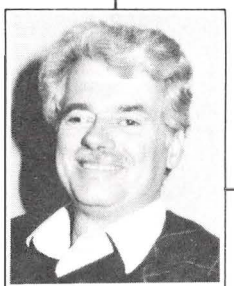

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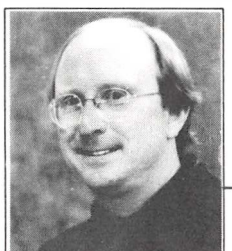

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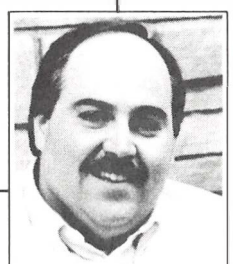

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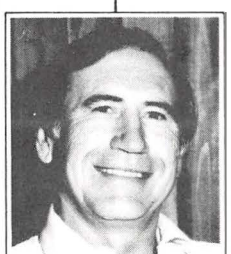

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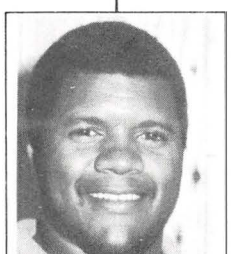

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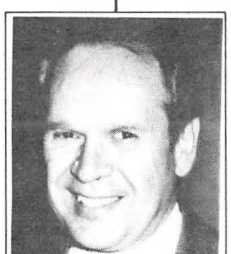

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TABLE 2. ACRES OF AERIALLY-DETECTED DEFOLIATION CAUSED BY WESTERN SPRUCE BUDWORM IN REGION 2.

State	1988	1989
Colorado	427,000	52,000
Wyoming	55,800	0

Mountain pine beetle and western spruce budworm damage levels are down throughout most of the Region. Mountain pine beetle is still a major problem on the Douglas Ranger District, Medicine Bow National Forest and on the Norwood Ranger District, Uncompahgre National Forest. Douglas-fir beetle populations and subsequent tree mortality increased throughout much of the Douglas-fir and mixed conifer type in Colorado. Most of the current infestation started in stands of Douglas-fir hard hit by budworm in the recent past. Douglas-fir beetle populations also are developing in large-diameter trees burned in the 1988 fires around Yellowstone Park. Pockets of tree mortality caused by pine engraver beetle (*Ips pini*) were prevalent throughout the Black Hills National Forest, on the Nebraska National Forest, and in shelterbelts across South Dakota. The *Ips* population increase is associated with continuing drought conditions in the Region.

The gypsy moth trapping program continued throughout the Region. No gypsy moths were caught on National Forest System lands in the Region during 1989. On other land ownerships, 3 moths were trapped in western Wyoming, 3 moths were trapped in southwestern South Dakota, 5 moths were trapped in eastern Nebraska, and 10 moths were trapped in Colorado. No moths were caught in traps within treatment areas following eradication efforts in Lakewood, Boulder, and Fort Collins West, but 5 of the moths trapped in Colorado were located in the Fort Collins East treatment area. Gypsy moths were introduced on transplanted nursery stock around Omaha, Nebraska.

Dwarf mistletoes continued as the most damaging disease agents in the Region. Survey and suppression activities for lodgepole pine dwarf mistletoe have continued in Colorado and Wyoming. Forest Pest Management funded presuppression surveys on 1,879 acres on three National Forests and silvicultural control on 1,797 acres on six National Forests.

The growth regulator ethephon has been tested in several sites on lodgepole pine and ponderosa pine dwarf mistletoes for effectiveness in reducing spread of the parasite. Continued monitoring of previous tests is planned.

Injury caused by a variety of environmental stress conditions was conspicuous throughout the Region in 1989. Widespread winter drying (redbelt) affected conifers throughout much of Colorado, Wyoming, South Dakota, and Nebraska. Most trees are expected to recover. Frost damage combined with drought-stress resulted in extensive branch dieback and tree mortality, especially in Siberian elm and weeping willow, throughout much of South Dakota, Nebraska, and Kansas. Additional tree mortality is expected in the next 1-2 years. Decline in vigor was apparent for a variety of tree species on the Great Plains, and has been attributed to drought stress.

Failure of a small percentage of aspen stands to regenerate successfully has resulted in a study of several sites in the Region. Continued investigation of the causes of aspen sprout failures is planned for the future.

Forest health in developed recreation areas is an ongoing concern in the Region. Comprehensive forest pest surveys were conducted at the Chapman campground (White River NF) and at six

campgrounds in the Taylor River Canyon (Gunnison NF). Vegetation management plans are in various stages of development.

The use of pesticides continues as an important part of integrated pest management. Pesticides are valuable tools in forest tree nursery management and control of noxious weeds and undesirable vegetation in range management. More than 19,000 acres were treated with pesticides in 1989.

The major cover types in the Region have age class distributions which are not conducive to a healthy forest. In all cases, the majority of the trees in a cover type are approaching maturity. Insects and diseases are expected to be a driving force, along with fire, in modifying the current vegetation.

DOUGLAS-FIR COVER TYPE

Western spruce budworm: *Choristoneura occidentalis* Freeman

Western spruce budworm populations continued their overall decline in the Region. About 50,000 acres were infested in Colorado. Severe defoliation of white spruce and Douglas-fir occurred at Spruce Basin at Cotopaxi, the southern end of South Park near Salida/Buena Vista, and on the Pike National Forest west of the US Air Force Academy near Colorado Springs. Aerial application of *Bt* to 140 acres of white spruce and Douglas-fir at Lake Purgatory development north of Durango provided satisfactory control.

Pheromone traps were placed by FPM at 46 sites along the Front Range in Colorado during 1989. Three traps per site were used. Average trap catch per site ranged from 0 to 38 insects. Average trap catches on the Roosevelt, Arapaho, Pike, and San Isabel National Forests were 0.1, 0.9, 1.4, and 23.2, respectively. Trap catches of western spruce budworm were highest at the Oak Creek sites on the San Isabel NF. The data will be used to calibrate a system that predicts defoliation that will occur in the year following trap catch.

The technique is expected to replace egg mass surveys, which have been used historically. The project is expected to continue for two to three years, or until a good correlation is obtained between predicted defoliation based upon trap catch and actual defoliation.

Douglas-fir tussock moth: *Orgyia pseudotsugata* McDonnough

Between 1983 and 1986, several small stands of Douglas-fir were severely defoliated along the Platte River drainage, Pike National Forest. That activity prompted the establishment of 60 permanent pheromone survey plots on the Pikes Peak and South Platte Ranger Districts in 1986. Plots were resurveyed in 1989, but no Douglas-fir tussock moths were caught.

Douglas-fir beetle: *Dendroctonus pseudotsugae* Hopkins

During the last decade, most of the Douglas-fir and mixed conifer forest types in the Region have experienced an outbreak of the western spruce budworm, (*Choristoneura occidentalis* Freeman). Several years of severe defoliation in these forest types have resulted in dead and dying stands of Douglas-fir. Following the budworm outbreak, Douglas-fir beetle populations have increased and infestations have spread from weakened trees that barely survived the budworm outbreak to healthier stands of Douglas-fir.

In Wyoming, salvage efforts are underway in several of the budworm-damaged and fire-scorched areas. In many of these stands, silviculturists are faced with the decision to do nothing and risk losing the Douglas-fir seed source or to do a seed cut and hope that opening the stand will improve the vigor of the seed trees and make them less susceptible to subsequent attacks. Where management objectives mandate the retention of a conifer cover type, e.g., in Douglas-fir stands being managed for big game winter thermal cover, the decision is a difficult one. Often, the trees best suited for retention are the larger-diameter trees in the stand which are also the most attractive to the Douglas-fir beetle. A cost-effective method to protect seed trees from Douglas-fir beetle attack would be a helpful tool for the silviculture of Douglas-fir in Colorado and Wyoming.

Field research using semiochemicals [MCH (3-methyl-2-cyclohexen-1-one)] to manage Douglas-fir beetle populations has shown some promising results. Plans are being developed to test semiochemicals (MCH) in several stands in Colorado and Wyoming. MCH acts as a repellent and shows potential for protecting high value trees.

In Wyoming, high brood production was present in large-diameter Douglas-fir blackened in 1988 by the Clover Mist fire on the Clarks Fork Ranger District of the Shoshone National Forest. Tree baits containing frontalin attractant will be used in 1990 to concentrate beetles in host trees around sale areas that could not be completely salvaged during 1989. Baited, infested trees will subsequently be removed to reduce the available population prior to 1991. The availability of many scorched, large-diameter Douglas-fir trees is expected to provide adequate host material for spread of the Douglas-fir beetle population in 1990.

Much of the area burned by the Clover Mist fire occurs in the Absaroka Wilderness where salvage and other treatment options are not appropriate or feasible. The Douglas-fir beetle infestation is likely to develop and increase in this area over the next few years due to the presence of large numbers of suitable hosts.

Douglas-fir dwarf mistletoe: *Arceuthobium douglasii* Engelm.

Dwarf mistletoe occurs on Douglas-fir in the southern two-thirds of Colorado. No suppression projects were funded by FPM during 1989 for this mistletoe species.

PONDEROSA PINE COVER TYPE

Mountain pine beetle: *Dendroctonus ponderosae* Hopkins

Mountain pine beetle populations have generally declined throughout the Region over the past 4 years, but in some areas the beetle continued to cause significant tree mortality.

In Colorado, a persistent mountain pine beetle outbreak which began around 1980 continued on approximately 12,000 acres of the Uncompahgre Plateau in the southwestern part of the state. Twenty-five percent of the 100,000 acres of pine type on the plateau remain at high risk.

Results of a ground survey conducted after the 1989 beetle flight indicate that tree mortality will continue at the current rate.

Two other species of *Dendroctonus*, the roundheaded pine beetle (*D. adjunctus* Blandford) and the western pine beetle (*D. brevicomis* LeConte), were also at unusually high population levels in this

area. High populations of these insects may be correlated with the below normal precipitation the area has experienced in the last few years.

An Environmental Impact Statement (EIS) describing alternatives for managing the pine type on the plateau will be completed in October 1990.

In Wyoming, tree mortality continued on about 9,750 acres on the Douglas Ranger District, Medicine Bow National Forest (refer to section on Cottonwood-Esterbrook project).

In South Dakota, the Black Hills National Forest showed a significant decrease in tree mortality caused by mountain pine beetle since the 1987 aerial survey. About 2,400 acres were affected, primarily between Bear Mountain and Deerfield Lake.

Cottonwood-Esterbrook Project--The Cottonwood-Esterbrook Integrated Pest Management Project, begun in July 1988 in Albany and Converse Counties in Wyoming, continued through 1989. The goal of this project is to manage the resources in the area in a manner that is not conducive to the development or perpetuation of pest problems. The objectives are listed in the 1988 report (Johnson, et al. 1989).

The project area covers approximately 173,440 acres and encompasses the Medicine Bow National Forest, Bureau of Land Management, State of Wyoming, and private lands. Private landowners are organized into the Laramie Peak Pine Beetle Association.

Examination of brood samples during July 1989 indicated a population decline due to winter mortality. A survey of beetle attacks conducted in October 1989 showed a ratio of 1989 to 1988 attacks of 0.4:1. The population reduction is expected to be temporary as is typical of most weather-related mortality factors. Management efforts are continuing as planned in the project area. The 1989 population reduction may provide additional implementation time for beetle control efforts.

Management of mountain pine beetle with semiochemicals--Field tests of the MPB anti-aggregation semiochemical, verbenone, were conducted in 1988 and 1989 on the Black Hills National Forest and on the Uncompahgre National Forest to determine the product effectiveness in reducing the number of beetle attacks in susceptible ponderosa pine stands. Five treatment rates were tested each year, ranging from 0 to 68 verbenone capsules per acre. None of the treatments were effective at reducing the number of trees attacked by the beetle in 1988 or 1989 tests. Following the 1988 tests, it was hypothesized that above average temperatures which followed early deployment of the capsules may have resulted in depletion of the material or changes in chemistry before the peak beetle emergence period. In 1989, quantitative and qualitative analyses of field-collected verbenone capsules were conducted periodically throughout the test period. Enough verbenone remained in the capsules at the end of the test period to discredit evaporation or chemical breakdown as a cause of treatment ineffectiveness. Another verbenone test is planned for 1990 on the Uncompahgre Plateau.

Pine engraver beetles: *Ips* species

Ips populations were prevalent in the Black Hills during 1989. Drier than normal weather likely contributed to their presence in standing trees. Infestations were abundant near thinning operations and in highly stressed trees. Scattered pockets were present from Custer to Spearfish in South Dakota and in the Bearlodge Mountains north of Sundance, Wyoming. Large pockets were present near Pactola Reservoir where a trail is being constructed and near Sheridan Lake where a 1987 prescribed burn damaged trees. Funnel traps baited with dienol attractant were used to mass trap beetles at Pactola Reservoir and on a number of privately-owned sites in the Black Hills. Additional